REQUEST FOR RECONSIDERATION

Applicants thank Examiner Salvatore for the helpful and courteous discussion of July 23, 2003 in parent application 09/926,282. During the discussion, Applicants' U.S. representative presented arguments that none of the prior art relied upon by the Examiner discloses the presence of a porous film of a thermoplastic resin in any of the laminate structures described therein. Applicants' U.S. representative further argued that the prior art references relied upon by the Examiner do not discloses thermoplastic resin layers or thermoplastic resin thread layers having a weight of from 1 to 50 g/m^2.

The present application is a Continuation Application of U.S. 09/926,282, filed October 5, 2001. The present Amendment is filed responsive to the Office Action of June 23, 2003 in the parent application.

Applicants have claimed a preform that includes a multi-layer laminate structure. The laminate includes layers of a reinforcing material and a layer which is made of at least one of a thermoplastic resin or thermoplastic resin threads. The presence of the thermoplastic resin layer or threads helps to ensure that any liquid resin used to impregnate the laminate does so in a uniform manner that does not leave voids inside the cured preform. Applicants have shown by way of examples (see Table 1 on page 10) that the claimed invention provides significantly less damaged areas in comparison to laminates that do not contain a porous thermoplastic resin layer.

Table 1 on page 10 of the specification is reproduced below for convenience.

Table 1

	Form of thermoplastic resin	Weight per square meter of thermoplastic resin layer (g/m^2)	Damaged area (relative value)	
			Condition 1	Condition 2
Reference Example	None	0	100	100
Example 1	plain fabric	10	73	68
Example 2	uniaxial fabric	10	70	65
Example 3	non-woven fabric	10	69	66
Example 4	chopped fiber	10	72	68
Example 5	reticulated structure	10	66	63
Example 6	porous film	10	65	61

As can be seen from the Table above, the damaged area analysis of a preform that contains a thermoplastic resin film or a thermoplastic resin fabric is lower than the area damaged when the laminate does not contain any thermoplastic resin layer or thermoplastic resin fabric.

Claims 1 and 4 have been amended to require that the thermoplastic resin layer or thermoplastic resin threads have a weight of from 1 to 50 g/m^2. Support for the amendment is found in original Claims 3 and 5. The presence of a thermoplastic layer having this characteristic provides a cured preform exhibiting significantly superior performance properties.

It is disclosed in the present specification:

> "If the amount of the resin [of the thermoplastic resin layer] is less than 1 g/m^2, fracture toughness, which prevents interlaminar debonding, is not sufficiently exhibited, and if the amount of resin is larger than 50 g/m^2, the width between the layers of reinforcing material becomes thicker and stress transfer is insufficient when the resin is used in the composite material" (page 4, lines 9-13).

The Office rejected claims 1-2, 4 and 7 under 35 U.S.C. § 102(b) in view of a patent to Bompard (U.S. Patent No. 5,484,642) and a published PCT application to Ludwig (WO 92/06845). Claims 3 and 5 were rejected under 35 U.S.C. § 103(a) in view Bompard and

Ludwig. Applicants respectfully traverse the rejections in view of the amendment to independent Claims 1 and 4 and the Declaration submitted concurrently herewith under 37 C.F.R. §1.132.

In the Declaration several composite materials are described wherein the weight per area of the thermoplastic resin layer is varied. A weight per area of less than 1 g/m^2 (e.g., 0) or greater than 50 g/m^2 provides inferior compression after impact, compression interlaminar shear strength and interlaminar shear strength (see Table below reproduced from the Declaration submitted herewith).

Table 3

	Thermoplastic resin layer	g/cm^2	*0*	1	10	50	*100*
Composite material $(0°)_8$	Thickness	mm	*1.76*	1.73	1.87	2.29	*3.06*
	Comp density (ρ comp)	g/cm^3	*1.55*	1.54	1.50	1.42	*1.33*
	Carbon fiber content	% by vol.	*58.3*	57.6	51.0	39.1	*25.5*
Performance	ILSS (0°)	MPa	*80.8*	78.9	76.5	61.6	*54.3*
	ILSS (90°)	MPa	*12.2*	13.0	12.6	11.9	*7.9*
	FS (0°)	MPa	*1397*	1292	1389	974	*649*
	FS (90°)	MPa	*69*	79	86	65	*48*
	FM (0°)	GPa	*87.4*	91.7	84.7	72.7	*52.4*
	FM (90°)	GPa	*5.7*	6.1	5.7	4.9	*4.0*
	CAI damaged area (360in-lb)	cm^2	*21.7*	19.0	16.0	9.5	*11.2*
	comparing with 0g/m^2	%	*100*	87.6	73.5	43.8	*51.6*
	CAI strength (360in-lb)	MPa	*147*	156	153	157	*137*

ILSS = Interlaminar shear strength
FS = Bending strength
FM = Bending elasticity
CAI = Compression after impact
Italicized columns represent cured performs that are outside the claimed 1 – 50 g/cm^2 range.

As is evident from the results in the Table above, when the weight per unit area of the thermoplastic resin layer is greater than 50 g/cm^2 the properties of the cured preform (see boxed rows, e.g., interlaminar shear strength, bending strength, bending elasticity and compression after impact) are substantially poorer than the properties for a perform wherein the weight per unit area is from 1 to 50 g/cm^2. Likewise the compression after impact

strength of the claimed invention is greater than the cured comparative performs where the weight per unit area is 0 or 100 g/m^2 (see last boxed row).

Applicants have therefore demonstrated the criticality of a weight per square meter of 1 to 50 g/m^2 in the thermoplastic resin layer of the claimed perform.

Bompard nowhere discloses that the prior art laminate must contain a thermoplastic resin layer having a weight of from 1 to 50 g/m^2. Example 3 of the Bompard patent provides a fabric of polyamide threads that has a mass per unit area of 174 ± 18 g/m^2. This mass is outside of the presently claimed range. Example 4 provides a glass fiber fabric having a mass per unit area of 300 ± 15 g/m^2. The fabrics that may function as a permeable resin layer in the Bompard patent do not render the presently claimed invention obvious in view of the significantly superior results obtained for the claimed invention in comparison to performs where the thermoplastic rein layer has a weight per unit area outside the presently claimed 1 to 50 g/m^2 range.

Ludwig nowhere discloses the weight per area of the compressible spacer layer of polyamide fibers. In fact, Ludwig does not provide any inventive examples. The presently claimed invention cannot be obvious in view of the Ludwig publication in view of the document's silence with regards to the weight per area of any thermoplastic resin layer.

Claim 25 is a new independent claim. Support for new Claim 25 is found in original Claim 1 and Example 6 on page 9, line 21. The new independent claim requires that the thermoplastic resin layer is a porous film. The invention of new independent Claim 25, wherein a porous film of a thermoplastic resin is present, cannot be obvious in view of or anticipated by the prior art references relied-upon by the Examiner because the prior art references do not disclose or suggest a laminate containing a thermoplastic resin porous film.

Nowhere in the Bompard patent is it disclosed or described that the prior art reinforcing material must be a porous film. In fact, fabrics are preferred materials for the

prior art textile (column 3, lines 66, to column 4, line 4; column 4, lines 21-22; and column 4, lines 41-44). Likewise, Ludwig does not disclose that the prior art compressible spacer layer of polyamide fibers may be a film. This material is preferred to be a loose fleece-type mat (page 3, line 23).[1]

Applicants submitted an Information Disclosure Statement to the Office upon filing of the present Continuation Application. Applicants respectfully request the Examiner include a signed, initialed and dated copy of the form PTO-1449 with the next Communication from the Office to acknowledge consideration of the references provided thereon in the examination of the present application.

[1] The German words "lockere vliesartige Matte" may be translated to "loose fleece matt" as supported by pages 487, 780 and 502 of "The Oxford Duden German Dictionary, Clarendon Press (1990).

Applicants submit the amendment to the claims places all claims in condition for allowance. Applicants respectfully request the withdrawal of the claims and the passage of all now-pending claims to Issue.

Respectfully submitted,

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